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Against the Grain

"Linking Publishers, Vendors and Librarians"

The Year 2000 is Coming ... Are Your Data Coming With It?

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As the new millennium approaches, many libraries are taking the time to forecast their information needs, develop their collection development policies, and assess their technological requirements for the year 2000. The library literature is focused on such topics as electronic journals, document delivery, outsourcing, and disintermediation. All important topics ... all requiring the appropriate levels of debate and discussion.

There is one topic, however, that has received virtually no attention in the library literature, yet should be at the forefront of every serials/acquisitions professional's discussion list. That topic is known as the "Millennium Date" or "Year 2000" problem. ANY library that depends on ANY vendor to maintain institution-critical information that is date-sensitive, should be asking those vendors how their internal business systems are going to handle date manipulations for the year 2000 and beyond.

Sound ridiculous? Well, consider this:

- In 1990, in Denmark, a female received a letter from the local school board welcoming her to the first grade. Unfortunately, at the time she received the letter, she was 107 years old.
- A shopper picks up a package of food in a grocery store and checks the expiration date. It says "July 25, 1906"...
- In 1995, a subscription agency receives an order from a library for a

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If Rumors Were Horses

As we go to Press, we have learned of the purchase of a 90% stake in **VCH Publishers** by **Wiley** for \$100 million (*NYT*, May 8, 1996, p.C-4). The minority stake will be held by the **German Chemical Society** and **German Pharmaceutical Society**.

Speaking of VCH, the caring, sweet, wonderful and awesome **Inge Valentine** has been marketing consultant there for many years. I have to reminisce a minute. I remember being terrified of even meeting this woman, who replaced the fear-producing pussy cat **Otto Rapp** at Pergamon BE (before **Elsevier**) when he retired. I remember a delightful dinner with Inge and Otto I believe it was in San Antonio many years ago. How I miss Otto! And what a remarkable lady Inge is. I believe that she will now be marketing consultant at **AIP (American Institute of Physics)**. They couldn't have chosen a better person. Will you ever let **ATG** have an interview, Inge?

On April 9, 1996, a majority of the 14 members of the Sixth Circuit Court of Appeals voted for rehearing of the **Princeton University Press**

et al v. Michigan Document Services case en banc. Under Local Rule 14, the effect of the granting of a hearing en banc is to vacate the previous opinion and judgment of the three-judge panel and restore the case on the docket sheet as a pending appeal. The case will be re-briefed and re-argued in the near future. Read **Bill Hannay's** discussion in this issue, page 48.

On April 30, 1996, **Azalee Sain**, Coordinator of Collection Development with Library Resources, **North Carolina Community College System**, retired. Azalee began her association with the N.C. Community College System in 1967 and was an invaluable resource person to library professionals everywhere because of her extensive knowledge of the publishing and book jobbing industries. I know that the **Charleston Conferences** will not be the same without her, unless we can talk her into visiting us ...

Reba Leiding once Acquisitions Coordinator, Ferris State University (Big Rapids, MI) is now (as of June 3) Head of Acquisitions,
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five-year subscription, to begin January 1996 and end December, 2000. The account manager for the library enters the order. As she checks the invoice before sending it to her client, she notices that the computer has ordered and billed, not a five-year subscription, but 95 years of back issues.

A recent *Informationweek* article suggests that "...Never before in the history of computers has there been such a threat as the one posed by the year 2000 ... Now less than four years away, the turn of the century promises to wreak havoc on the world's legacy systems unless they're fixed or replaced."

As **Stan Johnson**, chief information officer at the Port of Los Angeles stated, "This is the biggest single information systems project the world has ever seen...". Unfortunately, as **Kevin Schick**, analyst at the **Gartner Group** speculated, "A lot of companies are like deer frozen in the headlights of a big truck coming right at them."

In discussing this issue, our intention is not only to make acquisitions people aware of this issue and how it affects them, which is important in and of itself, but also to illustrate the dangers inherent in ignoring technological change.

We have neither the space nor the expertise to give a full exposition of this problem. Instead, we will present a digest of what we have learned from research in the popular and technical press, and will provide some pointers to interested readers who wish to delve more deeply into the topic. Except on the issue of technological change in general, we have expressed no opinions, preferring to simply report what we have found.

We used many sources, included **Faxon Finder™**, **UnCover™**, and *The Michigan Information Transfer Source*, which performed several literature searches. Interestingly, a search in *Library and Information Science Abstracts* (LISA) produced no citations. We also used the **Year2000 home page** on the Worldwide Web <<http://www.year2000.com>> and the **Year2000 listserv**.

We will discuss four aspects of the problem:

1. What is the nature of the Year 2000 crisis, and how can it affect institutions and individuals?
2. How serious is the problem?
3. What is being/can be done about it, and how much will these efforts cost?
4. What, if anything, does this issue tell us about the nature of technological change?

The Nature of the Problem

Computer systems designers in the 60's, 70's, and 80's programmed these systems ("legacy" systems) to default the value of the first two

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Millennium

Advice to readers pursuing this topic: Evidently no one can agree on how to spell "millennium". The spell checker in Word for Windows 7.0, in which this is composed, likes two ens and two ems. However, we also found "milenium", "millenium", and "milennium." Best try all four.

Ironically enough, even though we found articles on this subject with the word "millennium" in the title, January 1, 2000 is <not>, in the view of most commentators, the first day of the 21st century; January 1, 2001 is. This is because there was no Year Zero; therefore the first 100 years AD began with the Year 1 and ended with the Year 100. That is, years ending in 00 are the last year of the century, not the first. Therefore, calling this crisis the "Millennium Date" problem is technically a misnomer, which is why the Web page is called "Year2000" instead. Try telling this to the headline writer for *Business Week*., however ("Glitch of the Millennium," November 13, 1995 issue, p. 54).

Everyone is Talking About...

SubscribeSM

The Internet subscription service that is saving libraries time and money!

"Internet ordering and on-line commerce are the waves of the future. Subscribe gives us the ability to use this new network technology today."

Bernie Hurley, Director of Access Services,
University of California, Berkeley

"The system really works. Our initial trial of the Subscribe software met or exceeded all of our expectations. We believe [Subscribe] has the potential to transform the way libraries handle serials."

Rush Miller, Director of the University Library
Systems, University of Pittsburgh

"With Subscribe our money goes directly to the publisher. We have more control over our ordering and most importantly, no more floating payments.

Fast, reliable and cost-effective!"

Barbara Spiegelman,
Technical Information and Communications Manager,
Westinghouse, Inc.

"We have a responsibility to the organization to save costs wherever possible. Using RoweCom's Subscribe is a significant step in the right direction."

Robert Mangan,
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digits of any year field to "19." They did so because, for most of this period, digital storage was considered expensive, and they strove wherever possible to reduce storage needs. They also assumed that their systems would be replaced or completely re-designed well before the turn of the millennium.

This did not happen, with the result that (according to one estimate) there are (worldwide) an estimated one trillion lines of legacy code, currently in use, which will be unable to cope with years beginning "20."

What does "cope" mean? In the case of the subscription order mentioned above, the computer interpreted the last two digits of the subscription period as meaning, not "2000," but "1900," because it was "hardcoded" to do so. It then subtracted 1900 from 1995 and determined that the period of the order was 95 years. Since the order started in 1900, it must have been a back issue order. Therefore it went to the rate file, found the rate for back issues, multiplied it by 95, and printed the total on the invoice. Yikes!

(Perhaps this is another example of the dangers of "disintermediated" services. Only the alertness of the human account manager prevented a potentially very costly mistake).

The literature abounds with horror stories of what has happened or might happen similar to the ones that open this article:

A man of 103 supposedly was checked into a U.S. hospital and assigned to the pediatric ward.

One of the author's wives lost her ATM card. She went to her bank, where a teller began inputting data to create an order to replace the lost card. Ordinarily the bank assigns expiration dates for ATMs that are five years out. However, the bank's computer would not accept "00" as the expiration year (because to the computer it looks like an earlier than

Calendars and other Weirdnesses

One of the side benefits, if that's the right word, of researching this article was learning about the origins and idiosyncrasies of the calendar, and how computer programmers make their machines calculate dates correctly (or sometimes don't).

For example, a local broadcaster in one of the authors' hometown (Ann Arbor) used to give what he called the "Julian date" of the current day as part of his lead-in to the news. Supposedly this was the number of days that had elapsed in the year so far.

It turns out that this date is more properly known as an "ordinal date." A true "Julian date" is the number of days that have elapsed since January 1, 4713 BCE (Before Current Era). It is not named after **Julius Caesar**, as one might expect, but after **Julius Scaliger**, the father of **Joseph Scaliger**, who invented it.

Although developed for astronomy, Julian dates, their near kin, Lillian dates (which begin October 15, 1582 and are named after **Aloysius Lilius**, who devised the leap year rules for the Gregorian calendar), and other "integer dates" are obviously useful in computer applications, since they allow simple calculation of the amount of time lapsed between two dates and other date functions.

An equally nifty piece of cocktail party trivia has to do with computer systems that deal with history. For example, during the French and Indian Wars the fortress of Louisbourg in Nova Scotia changed hands between the French and English several times. Each time it did so, the calendar changed, the French having adopted the Gregorian calendar long before, whereas the English used the Julian Calendar until 1752. (There are 11 days difference). In a computer system, how does one keep track of what happened when at Louisbourg when the calendar changed so often? (Hint: Don't ask us).

1995, the year in which this took place). The clerk assigned 1999 as the expiration year instead, but, clearly, if the bank does not fix the problem, <all> the bank's ATM cards will be useless on the morning of January 1, 2000.

For the same reasons, if the systems involved are not fixed in time, programs that run payrolls, credit card issuance, and insurance policy issuance, to name a few examples, will either crash, or, what is viewed within the computing community as worse, keep running while performing incorrect calculations. **Peter de Jager**, one of the consultants working in this area, gives an illustration: He was born in 1955, and until now computers calculated his age by subtracting 55 from the current year. In 2000, when he is 45, a non-Year2000 compliant computer will calculate his age as 55. It will subtract 55 from 00, obtaining -55, and then, since an age field is unlikely to accept a negative number, "correct" his age to 55, and issue his premium notice as if he were 10 years older than he really is.

An event like this one is easily detectable at the receiving end. Not all Year2000 problems are like this, however. **De Jager** reports the case of one insurance company that overstated its earnings by \$10 million due to a problem with the handling of the year 1999.

In fact, not all Year 2000 problems involve the Year 2000, per se. Two of the nastiest are the fact that many computer programmers over the years have assigned the year 1999 as the expiration year for archived data or for anything for which the programmer wanted to have no expiration date.

Even more pesky is the fact that January 1, 1900 was a Monday, while January 1, 2000 is a Saturday. Unfixed systems will not only have their dates wrong, they will also calculate the day of the week incorrectly, with imaginably nasty results on functions that are day dependent such as payrolls. Interestingly, even if an organization could magically correct all the date manipulations in its systems, this problem would remain. (The literature even reports one instance of a brand of workstation that seemed to gain or lose an hour at random, apparently thanks to a "leap second" adjustment in 1988 — but the issues around leap years are a different story.)

Any reader who has a PC (not a Mac) and wishes to experience the problem directly can perform the following experiment at home: Set the computer's clock to 11:59 PM on December 31, 1999. Shut the computer down (don't just suspend it). When you power it up a few minutes later, check the clock. Chances are, you will find your self back in 1980, or 1906, or some year other than 2000.

How Serious is the Year 2000 Problem?

For non-technical people who are not directly involved in this issue, it's hard to say. On the one hand, the issue has been described as a "[system] consultant's gold mine," and consultants undoubtedly are interested parties to the question. Many of the articles we found were, in fact, written by consultants.

On the other hand, the stories from systems administrators in the Web page's FAQ make hair-raising reading, if you have any connection with an organization that still uses a legacy system. [For the record, Faxon's system is Year 2000 compliant].

If you don't believe it, ask IBM. Last fall the company revealed that some of its decades-old hardware, such as the S/370 mainframes, cannot be modified at all to speak 2000-ese. Instead, users will have to replace those machines — at a cost of untold millions of dollars. (See "The Year 2000 Problem — Time's Running Out," *Informationweek*, Feb. 5, 1996, pp.30-34)

Often these FAQs take the form of, "Well, here at Instant Obsolescence, we have a legacy system, the code for parts of which dates to 1968 and is undocumented. We have four million lines of code to examine among the three of us who are on the project team. Management says they want the project done in six months, because they are not going to invest any more money in it. Please tell me what to do."

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In fact, the most consistent theme of the FAQ is the seemingly willful refusal of senior management of many businesses to accept that the problem even exists. (This is complemented by stories of senior IS managers who refuse to provide leadership on the issue because they will be retired before 2000.) Managements are confronted with a requirement to spend large sums of money (see next section for estimates of how much) and receive no benefit other than the ability to keep doing exactly what they have been doing, with no increase in productivity or profitability.

American business management has historically been unwilling to invest in complete system upgrades, as witness the fact that so many legacy systems are still around. On this issue, however, a preponderance of the commentators feel that ignoring the issue will result in the failure of the enterprise shortly after January 2000. After all, if you can't print an invoice, it is hard to collect your money.

Perhaps the single most alarming statement we read in our research was that programs using hardcoded two digit dates are <still being installed> as of this writing, primarily by smaller or understaffed IS departments.

What Can Be Done About It, and How Much Will These Efforts Cost?

The Year 2000 problem forces companies to incur large costs because there is evidently no way to automatically identify and correct every occurrence of a date in the code. "Changing from a two-digit to a four-digit year usually requires reading the code line-by-line, and manually changing all the relevant dates" (according to Butler). Obviously such an approach generates huge expenses in terms of programmer time alone.

There are software tools on the market by which systems people can perform impact analysis and testing, and it is expected that additional software will be available soon that can accept source code and write it out with four digit dates. On the other hand, as one IS director (of Chase Manhattan) put it, "Maybe this is the push we need to do a major conversion of our applications."

Estimates on costs to correct the problem range from \$80 billion to \$200 billion for the United States alone. Worldwide, one estimate is that the cost will range between \$300 to \$600 billion. One consultant estimated that with careful planning and preparation the \$200 billion figure for the U.S. can be reduced to \$50 billion. However, he points out that this figure represents the entire two-year budget of every IS shop in America.

On a more understandable level, **Union Pacific** has reported that it will spend \$15 million on its conversion project. Estimates of conversion costs for **Fortune 500** companies are between \$50 and \$100 million each.

Here is a sample estimate of the cost, taken from Butler: "[There are] 10,000 computer shops [i.e. systems offices] in the U.S. and Canada. If each shop has 1,000 programs, and half of these programs

use the date for more than just printing, that totals approximately 5 million programs that must be modified before the year 2000.


If that number is multiplied by an estimated one and half weeks to fix a program at a programmer's salary of \$50,000 a year ... Well, you can see why the estimates of \$50 to \$75 billion in costs started floating around."

What Should Information Professionals Do About All This?

Aside from taking the obvious step of making sure that one's own PC is Year 2000 compliant sometime in 1999, the best advice we can give comes not from us, but from **John F. Burns**, of the Canadian Imperial Bank of Commerce: "We're requesting that vendors certify that their products will work in the year 2000," he states, as quoted in *Business Week*. There may well be products and services that acquisitions librarians purchase on behalf of their organizations for which Year 2000 compliance is irrelevant; on the other hand, it is clearly crucial for others. Librarians who put their business out to bid or RFP are especially well-positioned to require Year 2000 compliance when relevant.

At the very least, acquisitions/serials professionals need to open dialog with their major vendors (subscriptions, monographs, systems) to determine where these companies stand in their resolution of this issue. It is not a trivial matter, so don't fall victim to a trivial answer. Chances are that a good portion of your vendors have yet to consider the ramifications of the year 2000. Be prepared to ask specific questions and ask for written assurances of how this problem is being addressed. After all, your institution pays these vendors a substantial sum of money each year. Part of the service that these vendors provide is the management and security of institution-critical, date-sensitive data. That data should be considered an asset for your institution, and as such, should not be compromised in any fashion.

Information professionals, and serials/acquisitions librarians in particular, need to become more acutely aware of how technology, in and of itself, is changing the dynamics of the library industry. Sure, we discuss the virtues of **Z39.50**, **EDI/X12**, access vs. ownership, and a myriad of other technology-induced issues. What we clearly need to focus on is which of the companies in this industry are prepared to survive the technological changes over the next few years. The "Year 2000 Problem" seems somewhat simplistic, but coupled with the other technological changes affecting our industry, it is a problem that will no doubt put some companies that we know out of business — or, if not out of business altogether, at least force those companies to consider selling or consolidating. The longer companies procrastinate, the more expensive these technological changes become. Soon, they become unaffordable.

Technology is a funny thing. While it is not clear whether the "Year 2000 Problem" will develop to the magnitude that many pundits predict, it is clear that precautions can be taken to protect your assets. 

Partial Bibliography

- Butler, Janet. 2000. "The Year of Judgement[sic]", *Managing Systems Development*, June, 1995, pp. 1-7.
- deJagr, Peter. "Do Your Systems Have Only Five Years to Live?" *Best's Review*, May, 1995, pp. 82-86.
- Glass, Robert L. "The Date Wars: Learning Management by Issue." *Information Systems Management*, Spring 1995, pp. 67-69.
- Bartholomew, Doug. "The Year 2000 Problem — Time's Running Out", *Informationweek*, February 5, 1996, pp. 30-34.
- Sager, Ira. "Glitch of the Millennium," *Business Week*, November 13, 1995, p. 54.
- Rogers, Alison. "Millennial Mess," *Fortune*, October 4, 1993, p. 13.
- Schick, Kevin. "The Year 2000 Date Crisis," *Government Finance Review*, August 1995, pp. 32-34.

FYI

Datamation published a special issue (January 1, 1996) devoted to the Year2000 dilemma, that contains several excellent (and scary) articles. It is accessible from the Year2000 Web site.

Also at this time, the Year2000 Website mounted an article entitled: "The Year 2000 as racket and ruse," reprinted from *American Programmer* (February 1996). The article claims that the entire issue has been overblown in seriousness by the consulting companies and that it is easily solvable. It is hard to reconcile this point of view with the prevailing opposite point of view expressed by most commentators, but readers are invited to make the comparison and decide for themselves.